

Chapter 1 starts Here

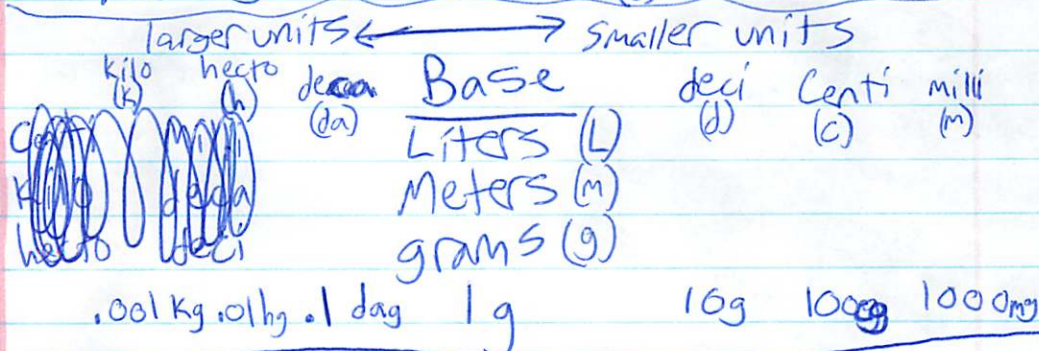
Ch.1 Matter + Measurement

Chemistry - ~~Study~~ Study of matter and how it changes.

Matter - Anything that takes up ~~a~~ space and has mass (amount) (Volume)

What can you measure?

Length \leftarrow SI unit
meters (m)
Volume Liters (L)
Mass Grams (g)



Setting up a conversion

$$15 \text{ km} \times \frac{1000 \text{ m}}{1 \text{ km}}$$

1. Multiply number by a fraction
2. Put units in fraction

\hookrightarrow convert to \rightarrow top
Convert from - bottom

$$15 \text{ km} \times \frac{1000 \text{ m}}{1 \text{ km}} = 15,000 \text{ m}$$

3. Put numbers into conversions
 \hookrightarrow Metric only

1. Put a 1 in front of bigger unit.

2. Put a power of ten base # of columns in front of smaller #

$$5 \text{ mm} = \text{---} \text{ hm}$$

$$5 \text{ mm} \times \frac{1 \text{ hm}}{100,000 \text{ mm}} = 0.00005 \text{ hm}$$

Accuracy - how close a measurement is to the real or accepted value.

Precision - how close a series of measurements are to each other.

$$\text{Accuracy - \% error} = \frac{|\text{observed value} - \text{actual value}|}{\text{actual value}} \times 100\%$$

calculate

$$\text{Precision} = \text{Avg.} \pm \frac{\text{Range}}{2}$$

5.23

4.85

4.96

5.28

4.91

~~5.04g~~

5.05g $\pm \frac{0.43g}{2}$

5.05g $\pm 0.215g$

Physical Properties - props of matter observed without change.

~~Not constant~~
extensive
Size
Shape
length
mass
Volume
texture

constant
Intensive
Color
Density
melting point
Freezing point
Boiling point

Amount
Dependent

Not amount dependent
Substance specific.

$$\text{Density} = D = \frac{m}{V}$$

$$D = \frac{3.14g}{10.6mL}$$

$$D = 0.296 \frac{g}{mL}$$

$$\text{Density of Water} = 1 \frac{g}{mL}$$

$$D = \frac{m}{V}$$

$$150 \frac{11.4g}{mL} = \frac{150g}{V}$$

~~$$150 \frac{11.4g}{mL}$$~~

$$V = \frac{m}{D}$$

$$V = \frac{150g}{11.4 \frac{g}{mL}}$$

$$V = 13.2mL$$

Finding Volume
water displacement
 $V_{\text{object}} = V_f - V_i$

Dimension
 $V_{\text{Box}} = L \times W \times H$
 $V_{\text{cylinder}} = \pi r^2 h$



Physics - 10th - 11th - 12th

Volume	1000	1000	1000
Area	100	100	100
Length	10	10	10
Width	10	10	10
Height	10	10	10
Depth	10	10	10
Radius	10	10	10
Angle	10	10	10
Force	10	10	10
Pressure	10	10	10
Temperature	10	10	10
Time	10	10	10
Mass	10	10	10
Energy	10	10	10
Power	10	10	10
Velocity	10	10	10
Acceleration	10	10	10
Displacement	10	10	10
Distance	10	10	10
Speed	10	10	10
Frequency	10	10	10
Wavelength	10	10	10
Amplitude	10	10	10
Phase	10	10	10
Period	10	10	10
Angular Velocity	10	10	10
Angular Acceleration	10	10	10
Angular Displacement	10	10	10
Angular Distance	10	10	10
Angular Speed	10	10	10
Angular Frequency	10	10	10
Angular Wavelength	10	10	10
Angular Amplitude	10	10	10
Angular Phase	10	10	10
Angular Period	10	10	10

$$\text{Density} = \frac{m}{V}$$

$$D = \frac{m}{V}$$

$$D = 0.2 \text{ g/cm}^3$$

$$\text{Density of Water} = 1 \text{ g/cm}^3$$

$$V = \frac{m}{D}$$

$$D = \frac{m}{V}$$

$$\frac{m}{V} = \frac{100}{100} = 1 \text{ g/cm}^3$$

$$V = \frac{m}{D}$$

$$V = 12.5 \text{ ml}$$

